

System Description

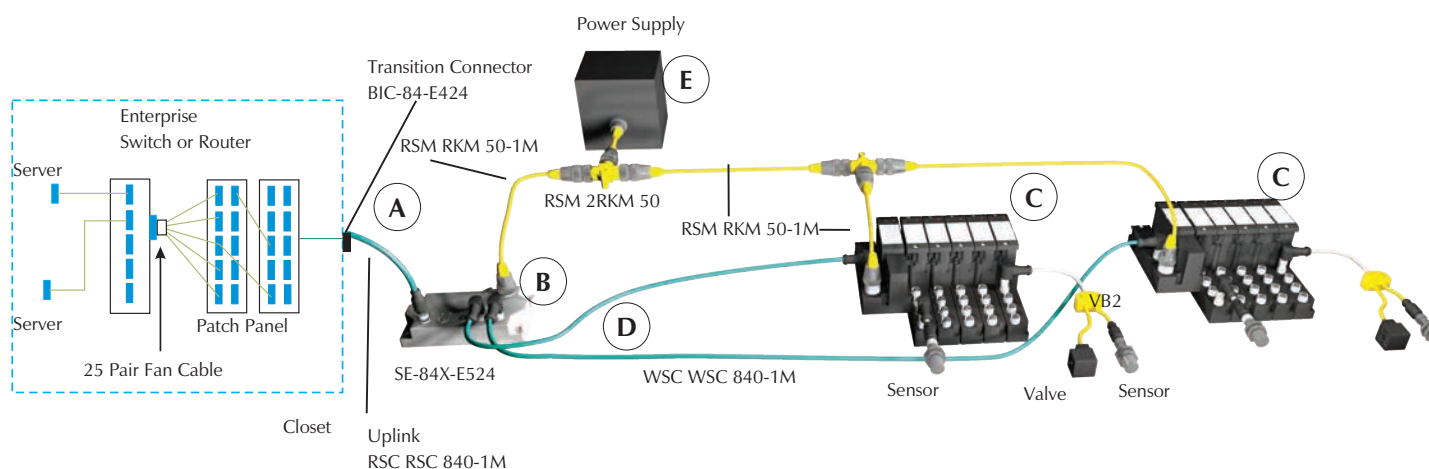
Ethernet is the most popular protocol used to connect office computers and peripherals today. It is increasingly finding its way into other applications, and is rapidly becoming the network of choice for higher level industrial control applications. Ethernet is primarily used to connect PLCs, computers, HMI displays and other high level components.

The term "Ethernet" actually refers to the lower level communication structure. Various different versions, or implementations, of Ethernet are available, such as Ethernet/IP™ and Modbus-TCP. It is important to note that while all of these different specifications use the same physical communication method and can operate on the same cable simultaneously, they cannot necessarily communicate with each other. For example, Modbus-TCP devices cannot communicate with Ethernet/IP devices. This is because the messages and communication protocol have been defined differently for these systems, even though the physical electrical structure is the same. Think of it as two people who speak different languages; they speak by moving air with their mouths, but the rules of the languages are different.

TURCK's BL67 Ethernet gateways provide a convenient way to connect industrial I/O devices directly to the Ethernet system, expediting monitoring and troubleshooting for the overall control scheme.

Typical System Configuration

Basic Parts List



A typical Ethernet system consists of the following parts:

- A - Controller
- B - Switches
- C - Ethernet I/O modules
- D - Ethernet cable
- E - Power supply

Ethernet I/O modules act as clients on a network. A server device is needed to retrieve data from and post data to the client. This is analogous to an office network, where the client PC on a user's desk may actively connect with multiple servers to access information in different areas of the enterprise. **TURCK** Ethernet stations are designed to be fully compatible with established Ethernet standards for industrial use.

Cordsets

TURCK offers a complete line of molded Ethernet cordsets to facilitate network installation, resulting in a faster start-up and fewer wiring errors. Cables are available with stranded or solid-core conductors, with or without shielding.

Most **TURCK** Ethernet equipment uses the 4 or 8-pin (M12) **eurofast**® connector specifications. These connectors provide a tough, rugged seal, and are IP 67 rated. In some cases (mainly in the control cabinet) a traditional RJ45 Ethernet connector needs to be used. **TURCK** provides RJ45 cordsets, as well as a variety of devices made to convert between RJ45 and **eurofast** connectors.

TURCK cordsets for the Ethernet system are available in standard lengths. Please contact your local sales representative to order custom lengths.

Addressing

Industrial Ethernet stations use the IP addressing scheme. An address defined by this scheme consists of four byte values usually displayed in decimal form, for example, 192.168.1.254. Different classifications of networks require different portions of this address to be constant for all devices on the network (referred to as a “subnet”). This means that the number of stations allowed on a particular network varies depending on what class of subnet is being used. If the first three bytes of the IP address are constant (which is common), then the remaining byte may be addressed between 2 and 254, resulting in 253 possible addresses.

Maximum Ratings

Ethernet allows different maximum cable lengths depending on the type of cable being used. Normally an Ethernet segment may be as long as 100 m, where 90 m must be solid core cable and the remaining 10 m can be stranded patch cords.

ModBus TCP/IP Ethernet Gateways



Gateway:
BL67-GW-EN
Programmable Gateway:
BL67-PG-EN



- Modular I/O
- IP 67 Protection
- Fieldbus Independent Configuration
- Various I/O Styles

Electrical

- Operating Current: <600 mA from V_{MB}
- Input Supply Current: <4 A (from V_I)
- Output Supply Current: <8 A (from V_O)
- Backplane Current: <1.5 A (from V_{MB})

Mechanical

- Operating Temperature: -12 to +55°C (-13 to +131°F)
- Protection: IP 67
- Vibration: 5 g @ 10-500 Hz

Material

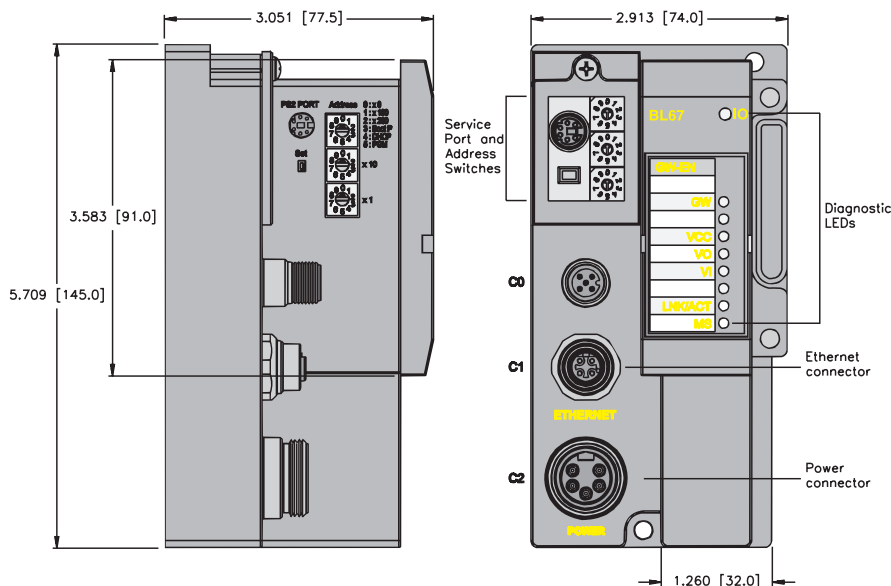
- Housing: PC-V0 (Lexan)

Diagnostics (Logical)

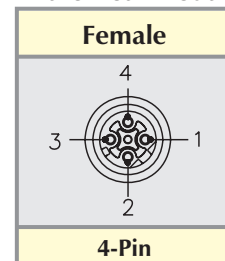
- Diagnostic information available through the system I/O map

Diagnostics (Physical)

- LEDs to indicate status of Network and Module Bus communication

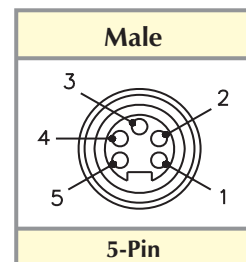


Ethernet Pinout



- 1 = TD+
- 2 = RD+
- 3 = TD-
- 4 = RD-

5-pin minifast® Power Pinout



- 1 = Gnd
- 2 = Gnd
- 3 = PE
- 4 = V_I
- 5 = V_O

Ethernet IP Ethernet Gateways



Gateway:
BL67-GW-EN-IP
Programmable Gateway
BL67-PG-EN-IP



- Modular I/O
- IP 67 Protection
- Fieldbus Independent Configuration
- Various I/O Styles

Electrical

- Operating Current: <600 mA from V_{MB}
- Input Supply Current: <4 A (from V_I)
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Mechanical

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Material

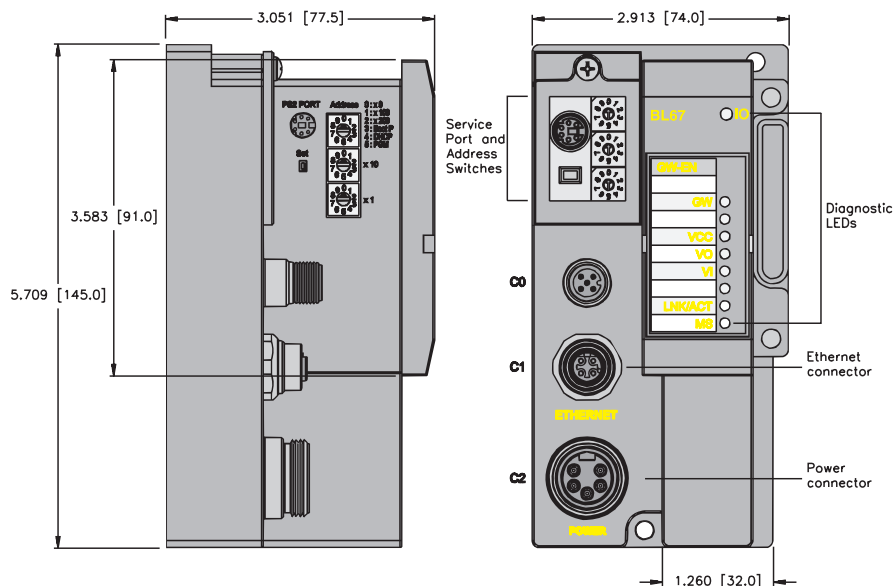
- Housing: PC-V0 (Lexan)

Diagnostics (Logical)

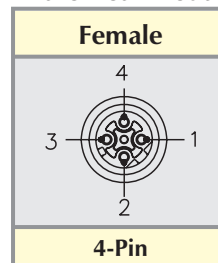
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Diagnostics (Physical)

- LEDs to indicate status of Network and Module Bus communication

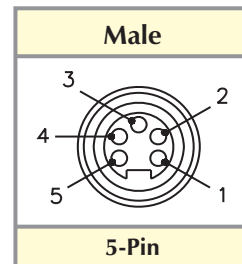


Ethernet Pinout



- 1 = TD+
2 = RD+
3 = TD-
4 = RD-

5-pin minifast® Power Pinout



- 1 = Gnd
2 = Gnd
3 = PE
4 = V_I
5 = V_O

Profinet Ethernet Gateways



BL67-GW-EN-PN



- Modular I/O
- IP 67 Protection
- Fieldbus Independent Configuration
- Various I/O Styles

Electrical

- Operating Current: <600 mA from V_{MB}
- Input Supply Current: <4 A (from V_I)
- Output Supply Current: <8 A (from V_O)
- Backplane Current: <1.5 A (from V_{MB})

Mechanical

- Operating Temperature: -12 to +55°C (-13 to +131°F)
- Protection: IP 67
- Vibration: 5 g @ 10-500 Hz

Material

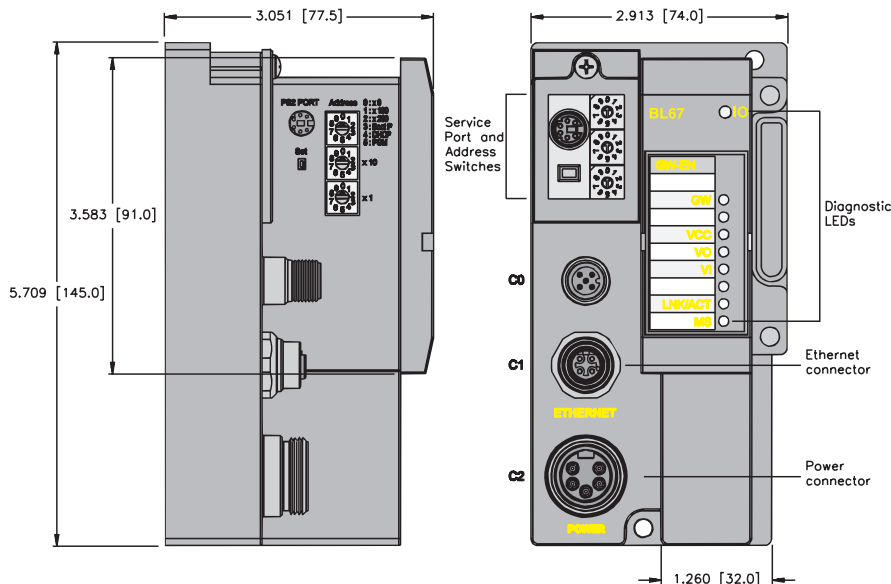
- Housing: PC-V0 (Lexan)

Diagnostics (Logical)

- Diagnostic information available through the system I/O map

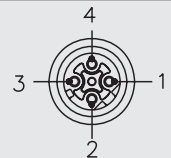
Diagnostics (Physical)

- LEDs to indicate status of Network and Module Bus communication



Ethernet Pinout

Female

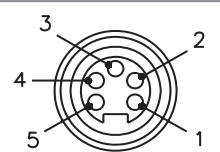


4-Pin

- 1 = TD+
- 2 = RD+
- 3 = TD-
- 4 = RD-

5-pin minifast® Power Pinout

Male



5-Pin

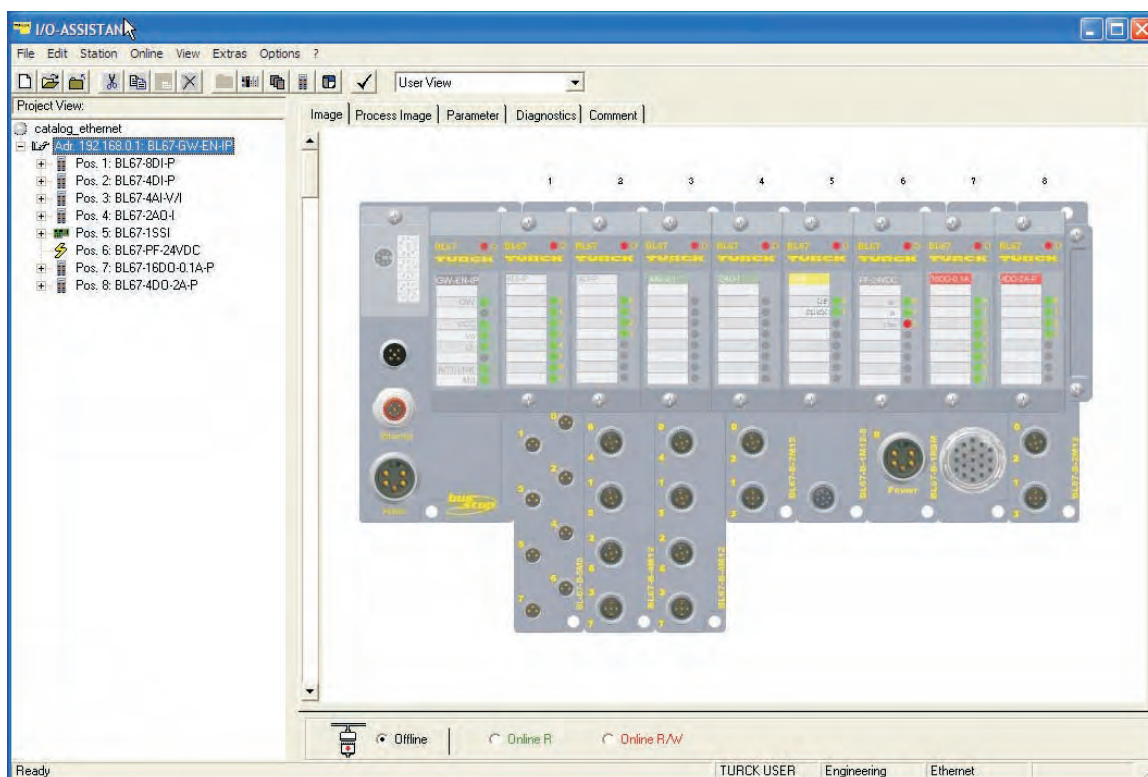
- 1 = Gnd
- 2 = Gnd
- 3 = PE
- 4 = V_I
- 5 = V_O

Ethernet BL67 Stations

TURCK's BL67 is a modular, user configurable network I/O system designed to allow installation of nodes containing different types and sizes of I/O depending on the users needs for a particular area. Featuring IP 67 protection and metal threaded connectors, the BL67 can often be mounted directly on a machine without the need to plan or purchase a separate enclosure for the I/O. This saves planning and installation time, as well as the cost of the enclosure itself.

The BL67 system supports several different network protocols, including Ethernet/IP™ and Modbus-TCP. A BL67 station consists of a gateway module that interfaces to the Ethernet system, and several I/O modules that interface with the physical I/O in the field. Different connector options are available to allow a greater level of customization to the user.

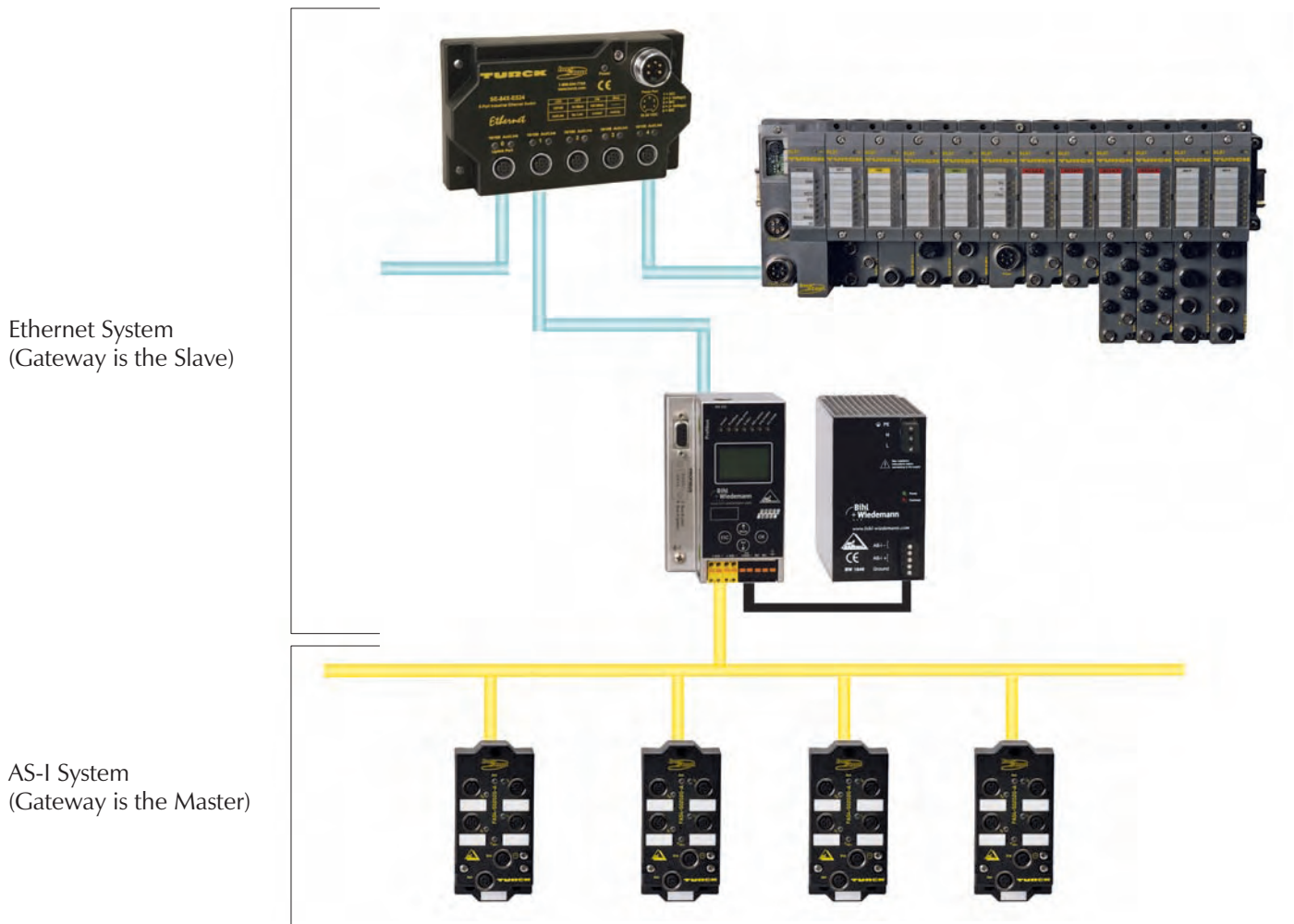
For more details on the BL67 system please see section G of this catalog.



Ethernet to AS-interface® Gateways

AS-I systems can be easily connected to a higher-level network, such as EtherNet/IP™ and Modbus-TCP, through a gateway master. The gateway acts as a master to the AS-I system(s) and a slave to the Ethernet system, mapping all of the AS-I data for Ethernet in a single block.

For AS-I specifications and rating details, see section E of this catalog.



Addressing

Ethernet stations must have an IP address for communication. The address for AS-i/Ethernet gateways may be set via the on-unit display and push buttons. Please consult the manual for a particular gateway for instruction on the procedure.

Diagnostics

AS-i/Ethernet gateways contain LEDs for diagnosing I/O and communication problems for Ethernet and AS-I. For a detailed description of the LED states, see the Bihl+Wiedemann AS-i/Ethernet Gateway User Manual available for download from Bihl-Wiedemann website.

Power

Most AS-i/Ethernet gateways draw power from the AS-I power supply. The option to use a separate, non-AS-I power supply is also available. Consult the gateway documentation to ensure the gateway being selected meets the requirements of your system.

Modbus TCP Gateways in Stainless Steel



ASI-ENG-SS BW1650*

ASI-ENG-SS BW1651*

ASI-ENG-SS BW1652*

ASI-ENG-SS-C1D2 BW1659

ASI-ENG-SS-C1D2 BW1660

ASI-ENG-SS-C1D2 BW1661

* not ETL Listed

- AS-I v3.0 Supported
- Graphical Display

- Integrated Ground-Fault Detection
- Integrated AS-I Diagnostics

Electrical

- Operating Current: 200 mA from V_{AS-I} (Power Supply A)
200 mA from V_{AS-i1} , 70mA from V_{AS-i2} (Power Supply A2)
250 mA from V_{AUX} (Power Supply E)

Power Distribution

- From AS-I supply for each network (Power Supply A, A2)
- From external supply (Power Supply E)

Mechanical

- Operating Temperature: 0 to +55°C (+32 to +131°F)
- Protection: IP 20

Material

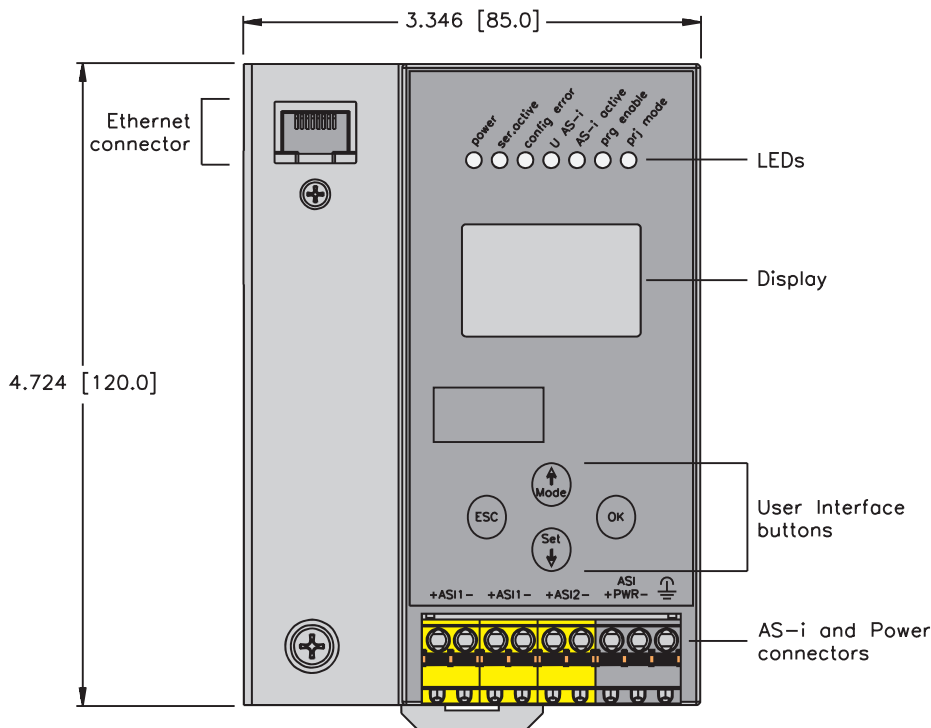
- Housing: Stainless Steel

Diagnostics (Logical)

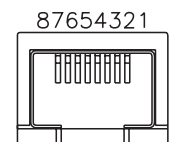
- Health of AS-I network is available via Network interface

Diagnostics (Physical)

- LED to indicate status of network and AS-I communication and power supply



RJ45 Ethernet Standard



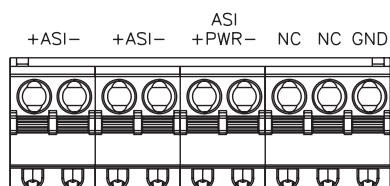
- 1 = WH/or (+TX)
- 2 = OR (-TX)
- 3 = WH/GN (+RX)
- 4 = BU
- 5 = WH/BU
- 6 = GN (-RX)
- 7 = WH/BN
- 8 = BN

Part Number	Higher Level Network	Power Style	AS-I Version	# of AS-I Masters	Duplicate Address Detection	Programming Interface
ASI-ENG-SS BW1650	ModbusTCP	A	3.0	1	X	X
ASI-ENG-SS BW1651	ModbusTCP	A2	3.0	2	X	X
ASI-ENG-SS BW1652	ModbusTCP	E	3.0	2	X	X
ASI-ENG-SS-C1D2 BW1659*	ModbusTCP	A	3.0	1		
ASI-ENG-SS-C1D2 BW1660*	ModbusTCP	A2	3.0	2		
ASI-ENG-SS-C1D2 BW1661*	ModbusTCP	E	3.0	2		

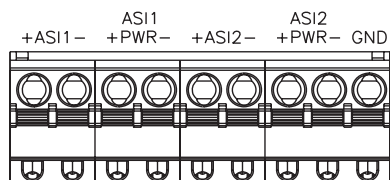
* Approved for use in Class 1, Division 2 areas

Input/Output Connectors

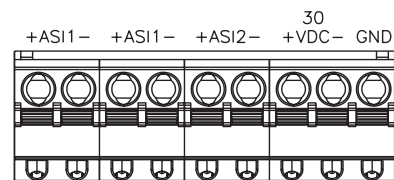
A



A2



E



A - Single AS-I network is powered by and AS-I power supply

A2 - Dual AS-I networks are each powered by their own AS-I power supply

E - Dual AS-I networks are both powered by a single 30 VDC supply, decoupled through the gateway

AS-I Ethernet/IP Gateways in Stainless Steel



ASI-EIPG-SS BW1828*

ASI-EIPG-SS BW1829*

ASI-EIPG-SS BW1833*

ASI-EIPG-SS-C1D2 BW1834

ASI-EIPG-SS-C1D2 BW1835

ASI-EIPG-SS-C1D2 BW1836

* not ETL listed

- AS-I v3.0 Supported
- Graphical Display

- Integrated Ground-Fault Detection
- Integrated AS-I Diagnostics

Electrical

- Operating Current: 300 mA from VAS₋₁ (Power Supply A)
200 mA from VAS_{-i1}, 70mA from VAS_{-i2} (Power Supply A2)
250 mA from V_{AUX} (Power Supply E)

Power Distribution

- From AS-I supply for each network (Power Supply A, A2)
- From external supply (Power Supply E)

Mechanical

- Operating Temperature: 0 to +55°C (+32 to +131°F)
- Protection: IP 20

Material

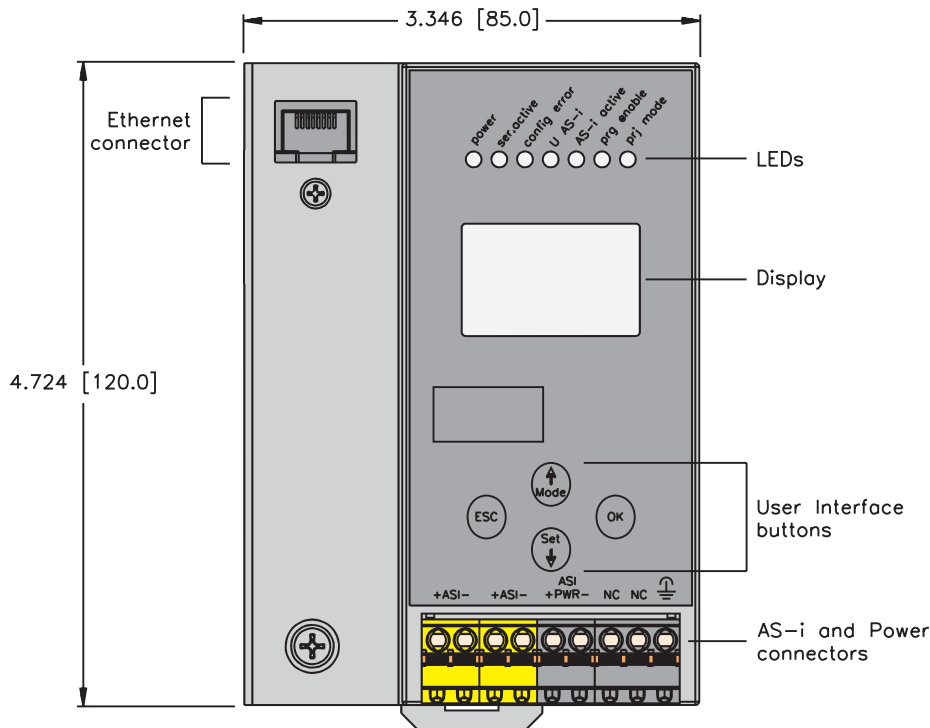
- Housing: Stainless Steel

Diagnostics (Logical)

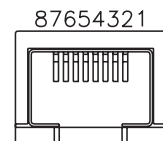
- Health of AS-I network is available via Network interface

Diagnostics (Physical)

- LED to indicate status of network and AS-I communication and power supply



RJ45 Ethernet Standard



- 1 = WH/or (+TX)
- 2 = OR (-TX)
- 3 = WH/GN (+RX)
- 4 = BU
- 5 = WH/BU
- 6 = GN (-RX)
- 7 = WH/BN
- 8 = BN

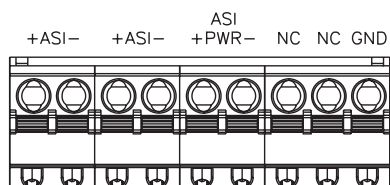
Part Number	Higher Level Network	Power Style	AS-I Version	# of AS-I Masters	Duplicate Address Detection	Programming Interface
ASI-EIPG-SS BW1828	Ethernet/IP	A	3.0	1	X	X
ASI-EIPG-SS BW1829	Ethernet/IP	A2	3.0	2	X	X
ASI-EIPG-SS BW1833	Ethernet/IP	E	3.0	2	X	X
ASI-EIPG-SS-C1D2 BW1834*	Ethernet/IP	A	3.0	1		
ASI-EIPG-SS-C1D2 BW1835*	Ethernet/IP	A2	3.0	2		
ASI-EIPG-SS-C1D2 BW1836*	Ethernet/IP	E	3.0	2		

Approved for use in Class 1, Division 2 areas

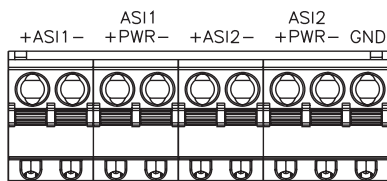
Ethernet

Input/Output Connectors

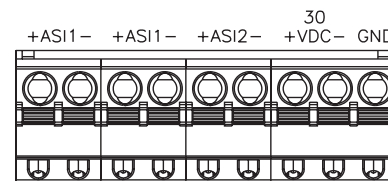
A



A2



E



A - Single AS-I network is powered by and AS-I power supply

A2 - Dual AS-I networks are each powered by their own AS-I power supply

E - Dual AS-I networks are both powered by a single 30 VDC supply, decoupled through the gateway

AS-I ProfiNET Gateways in Stainless Steel



ASI-PNG-SS BW1912



- AS-I v3.0 Supported
- Graphical Display
- Integrated Ground-Fault Detection
- Integrated AS-I Diagnostics

Electrical

- Operating Current: 300 mA from V_{AS-I} (Power Supply A)

Power Distribution

- From AS-I supply

Mechanical

- Operating Temperature: 0 to +55°C (+32 to +131°F)
- Protection: IP 20

Material

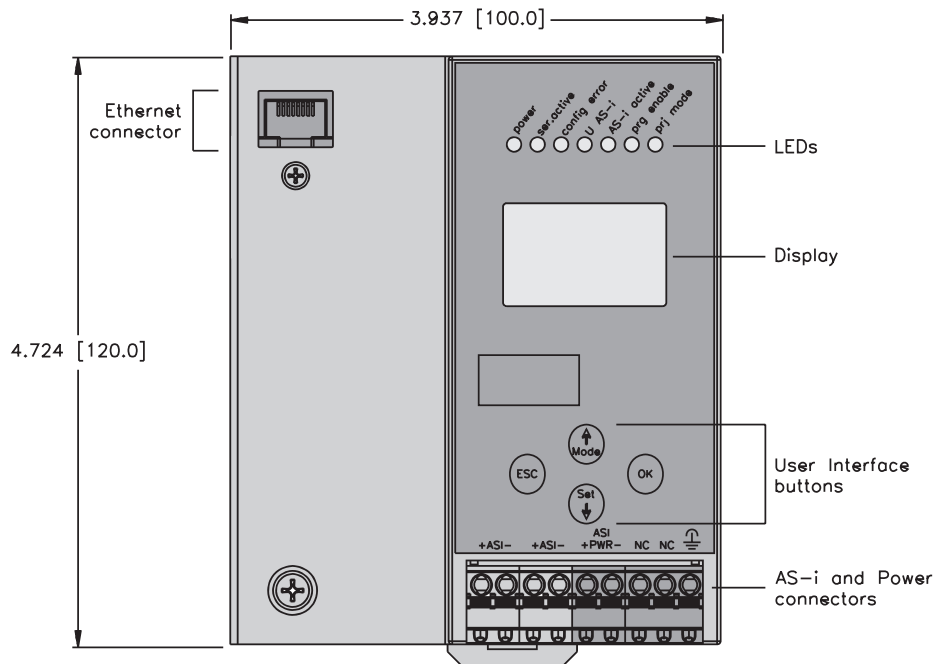
- Housing: Stainless Steel

Diagnostics (Logical)

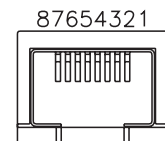
- Health of AS-I network is available via Network interface

Diagnostics (Physical)

- LED to indicate status of network and AS-I communication and power supply



RJ45 Ethernet Standard

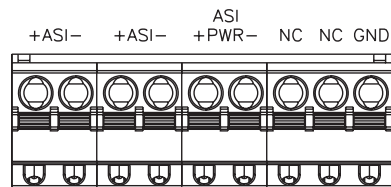


- 87654321
- 1 = WH/or (+TX)
 - 2 = OR (-TX)
 - 3 = WH/GN (+RX)
 - 4 = BU
 - 5 = WH/BU
 - 6 = GN (-RX)
 - 7 = WH/BN
 - 8 = BN

Part Number	Higher Level Network	Power Style	AS-I Version	# of AS-I Masters	Duplicate Address Detection	Programming Interface
ASI-PNG-SS BW1912	PROFINET	A	3.0	1	X	X

Input/Output Connectors

A



A - Single AS-I network is powered by and AS-I power supply